

9.7 PHOSPHORUS

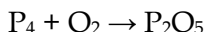
Allotropes of phosphorus

1. White phosphorus
2. Red phosphorus
3. Black phosphorus
4. Violet phosphorus
5. Scarlet phosphorus

1. Name any two allotropes of phosphorus.

Chemical properties:

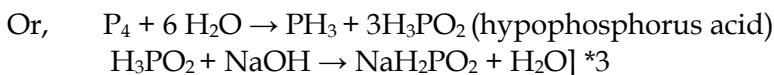
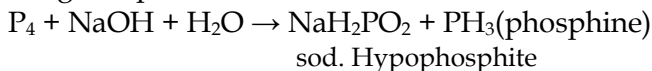
Action of air: When it is exposed to moist air, it produces phosphorescence, also called ghost light or cold light.



Phosphine (PH_3)

Lab preparation of phosphine

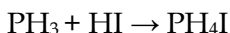
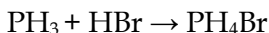
When white phosphorous is heated with caustic soda (NaOH), phosphine gas is produced.



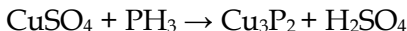
2. Give a balanced chemical equation for the preparation of phosphine gas.
3. What happens when white phosphorous is heated with aqueous caustic soda?

Chemical properties:

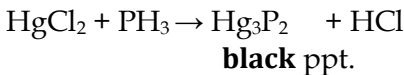
1. **Basic nature:** Phosphine is weakly basic (weaker than NH_3) but does not change the colour of red litmus paper. It forms phosphonium compounds



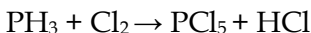
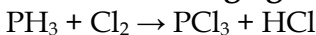
2. **Phosphine as a precipitating agent:** When PH_3 gas is passed into copper sulphate solution, black ppt. of copper phosphides is formed.



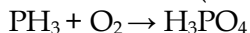
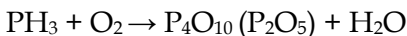
Similarly, with mercuric chloride (HgCl_2), black ppt. of mercuric phosphide is obtained.



3. **Phosphine as reducing agent** Action with Cl_2 or Br_2 gas



4. Action of air (oxygen): non-supporter of combustion. But when heated with oxygen phosphorous pentoxide or phosphoric acid is formed



Uses of phosphine gas:

1. It can be used as a reducing agent
2. It is used to prepare PCl_3 , PCl_5 , P_2O_5

1. Which statement regarding PH_3 is incorrect?

- a. With HCl it forms phosphonium chloride
- b. PH_3 can be used as oxidizing agent
- c. PH_3 is less basic than NH_3
- d. P contains a lone pair of electrons

***** This is not a complete note. It is just to guide you. It is recommended to study prescribed textbooks along with this material. *****